1. 10 pts.   A laptop has 3 choices for a processor, 2 choices for a graphics card, 4 choices for memory, 6 choices for a hard drive, and 5 choices for keyboard color. How many ways can the laptop be customized?

2. 10 pts.   Two cards are selected at random from a standard deck of 52 playing cards. The first card is replaced before the second card is selected. Find the probability of selecting a diamond and then selecting a face card.

3. The table below shows the estimated number of earned degrees (in thousands) conferred in 2000 by level and gender. Say someone who earned a degree in 2000 is randomly selected. Find the probability of getting someone who...

   (a) 6 pts.   Earned a master's degree in 2000.

   (b) 8 pts.   Earned an doctor's degree or a master's degree in 2000.

   (c) 8 pts.   Earned a bachelor's degree in 2000 given the person is a man.

   (d) 8 pts.   Is a man given the person earned an associate's degree in 2000.

|  |  | GENDER |  |  |
|---|---|---|---|---|
|  |  | Men | Women | Total |
| L E V E L | Associate | 208 | 323 | **531** |
|  | Bachelor | 502 | 659 | **1161** |
|  | Master | 187 | 227 | **414** |
|  | Doctor | 27 | 19 | **46** |
|  | **Total** | **924** | **1228** | **2152** |

4. 10 pts.   Of the boxes produced by a company, 5% have a puncture, 8% have a smashed corner, and 0.4% have both a puncture and a smashed corner. Find the probability that a randomly selected box has a puncture or has a smashed corner.

5. 10 pts.   A physics club has 27 members. How many different ways can the club select a president, vice president, treasurer, and secretary?

6. 10 pts.   In how many distinct ways can the letters in the German word *SONNENUNTERGANG* be arranged?

7. 10 pts.   A shipment of 15 microwave ovens contains 3 defective units. A restaurant buys 4 of these units. What is the probability that the restaurant buys at least two of the defective units?

8. [15 pts.] The number of dogs per household in a small town is as follows:

| Dogs | 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Probability | 0.686 | 0.195 | 0.077 | 0.022 | 0.013 | 0.007 |

Find the mean, variance, and standard deviation of the probability distribution.

9. [10 pts. each] Gomer Trundlebum spent the weekend partying in the company of magical jellybeans from the Flowr of Lyfe cannabis dispensary in Eugene, Oregon. When the last strains of other-worldly sitar music faded from the maelstrom of his mind on Monday morning whilst vanquishing the munchies at Ye Olde Pancake House on 11th Avenue, he suddenly remembered that he had a quiz that day in his quantum electrodynamics class. The quiz consists of eight multiple-choice questions, each question having five choices: one right, four wrong. Not knowing a Hermitian conjugate operator from a hole in the ground, Gomer must randomly guess the answer to every question.

(a) What is the probability Gomer will get precisely three questions right?

(b) What is the probability Gomer will pass the quiz, if passing requires getting a score of at least 70%?

10. [10 pts. each] An oil prospector plans to drill holes in a region until a productive well is found or funds are exhausted. Geologists estimate the probability any single drilling will be successful to be 0.21.

(a) What is the probability that the third hole drilled is the first to yield a productive well?

(b) If the prospector can afford to drill no more than six wells, what is the probability that the search for a productive well will fail?

11. [10 pts. each] A first draft of a mathematics textbook has an average of 2 typographical errors per page. Assuming a Poisson distribution, find the probability that the number of typos on a randomly selected page of the draft is...

(a) Exactly two.

(b) More than two.